

WHAT IS CLAIMED IS:

(1) A register circuit having a plurality of n-channel MOSFET transistors and a plurality of p-channel MOSFET transistors, accepting an input data, and a clock signal, and providing an output data,

said clock signal being a power clock signal having a gradually rising and gradually falling waveform generated by using a charge recycle power source in which power supplied to a load is at least partially collected to said charge recycle power source, and

following inequality is satisfied;

$$|V_{TN}| + |V_{TP}| \geq VDD$$

where  $V_{TN}$  is threshold of said n-channel MOSFET transistor,  $V_{TP}$  is threshold of said p-channel MOSFET, and VDD is output voltage of said charge recycle power source.

(2) A register circuit according to claim 1, wherein said register circuit comprises a pair of D-latch circuits with an input of a second D-latch circuit coupled with an output of a first D-latch circuit, a first D-latch circuit accepts a first power clock signal, and a second D-latch circuit accepts a second power clock signal which is different by 180° phase of the first power clock signal.

(3) A register circuit according to claim 2, wherein said D-latch circuit comprises a pair of NOR circuits with one of the inputs of each NOR circuit being coupled with an output of the other NOR circuit, and a pair of AND circuits each accepting an input data in differential form and a power clock signal, and providing an output to the other input of each of said NOR

circuit.

(4) A register circuit according to claim 1, wherein said register circuit includes a combination logic circuit between said pair of D-latch circuits.

(5) A register circuit according to claim 1, wherein said D-latch circuit comprises a memory element having a first inverter providing an output of the D-latch circuit, a second inverter with an input coupled with an output of said first inverter, and a first transmission gate connecting an output of the second inverter to an input of the first inverter, and a second transmission gate inserted between an input terminal and an input of said first inverter.